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COMPLIMENTS OF THE AUTHOR.

CHLORIDE OF METHYL.

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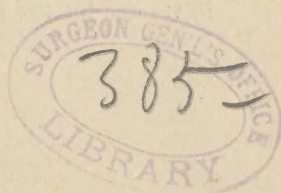


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The dental profession has long been in search of some practical means of alleviating the intense suffering which is often inflicted upon patients while preparing teeth for filling. We have now at our disposal numerous medicaments, each of which has its advocates. Creosote, carbolic acid, potassa, glycerine, cocaine, chloride of zinc, and various other therapeutic agents and combinations of remedies, are in daily use to accomplish this purpose. Some advocate the use of the sharpest and swiftest revolving burs; others of intense heat; and again others of extreme cold. All these agents have obtained their reputation by producing a more or less complete stage of anæsthesia of the terminal ends of the nerve fibrillæ, the results varying in different individuals and under different conditions and surroundings.

When we consider the density of the dentinal structure, the shortness of the period that a therapeutic agent remains in contact with the dentine, and the rapidity of the return of sensibility to the parts; we are forced to the conclusion that but rarely is there any absorption of a remedy, and consequently no persistent benefit is derived from it. The vain efforts of so many to procure good results by the use of cocaine alone, and the frequent success when this remedy is combined with others, is well known to all. If no distinctively therapeutic benefit is gained from these remedies, how then do they so often produce the desired results? The only reasonable conclusion is that local anæsthesia of the dentine as obtained at the present time, under any known process, is the result of counter-irritation.



Of all the counter-irritants, extreme heat and cold are certainly the most effective. The late revival of the use of the various ethers in the form of spray, for the production of intense cold, indicates that this method of obtunding sensibility is held in esteem by a portion of the profession. Although very successful in the application of the ether spray, I was deeply chagrined by the numerous disadvantages attending its use, chiefly the length of time required to produce the desired intensity of cold, and the consequent unpleasantness resulting from the volatilization of so much ether.

About this time, while attending to the teeth of Dr. G.W. Jacoby, President of the New York Neurological Society, I employed hydrochlorate of cocaine to produce the desired anæsthesia in the removal of some gum tissue which overlapped a third molar. This led to a conversation about local anæsthesia, and I learned that he had obtained remarkable success in the treatment of sciatica and all forms of neuralgia by the use of intense cold produced by chloride of methyl, and he referred me to an article by himself, entitled "Treatment of Neuralgias by Means of Intense Cold."

Chloride of Methyl was discovered in 1834. Its production was at first too complicated and expensive to admit of its general use. It was made by heating a mixture of sulphuric acid, methylic alcohol and sea salt. A very cheap process has been invented by C. Vincent, of France, and all the Chloride of Methyl used in that country is manufactured near Paris under his patent. He takes the remnants of beets used in the manufacture of sugar, and extracts from these the chlorate of tri-methylamine, which being subjected to a sufficient degree of heat produces the Chloride of Methyl.

At ordinary temperature this is a colorless gas of slightly etherous odor and sweetish taste. It boils at 23° C. Above this temperature it can be kept in a liquid state only by keeping it under high pressure in very strong air tight vessels. When relieved from pressure it returns at once to a gaseous state, producing a reduction of temperature from -23° C. to as low as -40° C.

Malassez and Ranvier have for some years employed this principle of artificial refrigeration for freezing histological specimens. The commercial value of Chloride of Methyl consists principally in its use for the extraction of perfume.

Débove is entitled to the credit of having first used Chloride of Methyl medicinally. The first patient on whom he used it had been suffering from a severe attack of sciatica for the cure of which various treatments had been employed in vain. Of this case Débove writes as follows: "I passed the jet of Chloride of Methyl over the entire painful service, from the hip to the external malleolus. A minute later the patient, who until then could not put his foot to the ground, walked around the ward without limping." Up to 1885 he had used the Chloride of Methyl in over one hundred cases. Since then numerous successful results have been published mainly by French physicians. In 1884 R. D. Santelli published the results of thirty successful cases treated by this means. Dr. Olive, of Nantez, describes four successful cases.

Before various meetings of the Société Médicale des Hôpitaux various successful experiences with this remedy were detailed by Rendu, Bucquoy, Sevestre, Legroux, Tenesson, and F. Rouillon, of whom the last detailed five cases of trigeminal neuralgia of from three months to fifteen years duration, in two of which both nerve-stretching and re-section had been performed unsuccessfully. Four of these cases were cured and one relieved.

A. Peyronnet de Lafonvielle writes of eight cases of trigeminal neuralgia of long duration which were relieved after several applications. In the article by Dr. G. W. Jacoby on this subject, previously referred to, he mentions five cases of tri-geminal neuralgia treated by this method. He says: "In all five cases the pain was entirely relieved after the first application. In one of the fresh cases there was no return of the pain. In two others the pain returned and a second application was made, with the result of relieving the pain again. In these also there has been no return. One of the old cases was so much ameliorated after four applications that he discontinued treatment, although not entirely well. In the fifth case I was able to obtain relief after each application and although six applications were made, there is no sign of permanent improvement. My general impression from this brief experience is, that we have in the Chloride of Methyl a reliable analgesic, which does not effect the general condition of the patient, and that it is invaluable in the treatment of neuralgias for the immediate relief of severe pain."

In the first successful experiments, the substance was placed in an ordinary thick glass syphon, provided with an attachment piece by means of which a fine spray could be produced. Numerous explosions of these syphons caused their abandonment. The apparatus as at present constructed consists of a copper cylinder having the capacity of about one litre. Above the cylinder is a strong screw which when fastened down prevents the escape of the methyl. When this screw is loosened the fluid escapes through a lateral opening into a smaller brass tube through the mouth of which it comes in the form of a fine spray which can be regulated in the most delicate manner by means of a micrometer screw. The brass adjustment is not well calculated for reaching the distal aspects of the posterior teeth, but does very well for other surfaces. I have designed for these posterior surfaces a special attachment which overcomes this difficulty. There are three methods of application, as follows: first, the direct application of the spray. Second, the glycerine method of Bardet. The part being first covered with glycerine the spray is directed against it, and the frozen glycerine is supposed to produce a more intense degree of cold. Third, the "stypage method" of Dr. Bailly, which consists in making a tampon of prepared cotton which ought to be enveloped in fine silk; (the cotton can be covered with glycerine if desired), and while being held with a pair of dressing forceps, deluged with spray and then immediately pressed against the painful point. The intensity of cold obtained by this method depends upon the amount of pressure with which it is applied against the surface, and it is supposed will produce a more intense cold than either of the other methods. It requires, however, too large a tampon to make it practicable in average sized cavities of teeth. This is the method, however, which seems to produce the best results in the various forms of facial neuralgia. I have also found it invaluable for producing relief and curing incipient pulpitis by means of the intense degree of counter irritation which it produces. The tampon should always be pressed against the point where the seat of the pain is located, but care must be taken not to hold it too long in position, as there is danger of its producing a blister or eschar; with a little care this can always be avoided. The tissue becomes pale and hard following the application and there is a momentary burning sensation followed by an immediate

relief from pain. In numerous cases the pain returns again and often it requires three or four successive applications to obtain a permanent cure. There are, however, forms of deep seated neuralgia, which while they are temporarily relieved, occur again at intervals. Jacoby's explanation is, that when the neuralgia is situated in the nervi nervorum (as it most generally is) the severe cold entirely destroys or at any rate completely paralyzes these nerve filaments, but when the seat of pain is in the nerve fiber itself, being not so accessible, the pain returns.

My first experience with the chloride of methyl occurred in February last. Mr. M., a professional vocalist, was sent to me for relief from severe neuralgic pain. A dentist in extracting the right inferior third molar had removed all of the process and a sufficient amount of the maxilla to expose a portion of the inferior dental nerve; cocaine produced a short respite; but the patient returned soon after with a recurrence of the pain and an agonizing appeal for something to be done for his relief so that he would be enabled to sing that evening. In my dilemma I thought of the chloride of methyl, and having sent for Dr. Jacoby's cylinder I used a tampon which resulted in an entire dissipation of the patient's suffering.

Early in March I procured from McKesson & Robbins a cylinder filled with chloride of methyl which they import from Paris, and determined to keep a record of my observations. I will detail a few of the most interesting cases:

March 5. Mrs. L. presented herself to have the posterior approximate and crown surfaces of the left superior second bicuspid and the anterior approximate and crown surfaces of the left superior first molar filled. Within the past two or three weeks she had a number of cavities filled without much pain. She was not of the nervous class that suffers from the slightest touch of an instrument. The excavation of these cavities proved to be excruciatingly painful; they were deep but did not reach the pulp. The rubber dam having been applied and the cavities dried, the cylinder of methyl being held in the left hand and the screw having been loosened, the nozzle was pointed as near the cavity as possible and with the right hand the micrometer screw was opened for about fifteen seconds. After this application the cavities were thoroughly

prepared by means of large engine burs and hand instruments without causing the slightest pain; the patient complained of a momentary sensation when the spray first struck the tooth's surface, but was delighted with the result. No bad effects have been noticed up to the present time, and on July 10th, it was found that the tooth responded perfectly to the cold and heat, showing that the pulp had not been injured.

March 18. Mrs. K. had a large cavity in the left inferior second molar to be filled; she was of that intense nervous temperament, that dreads every movement the operator makes. Her teeth had been under my charge for the past eight years, and I knew by bitter experience that operating for her was alike agonizing to dentist as well as patient. She was very skeptical, and my first application of the spray to the tooth was not very effective. This I believe was due to using an insufficient amount of methyl. A second application produced complete local anæsthesia.

March 21st. Mr. P., aged eighteen, a very nervous young man, and difficult to operate for; the right superior second bicuspid had a small cavity on the posterior approximate surface which was very sensitive. The application of the chloride of methyl produced complete local anæsthesia which lasted about two and a half minutes. It required two applications to prepare the cavity.

April 3d. Miss C. presented herself suffering with a toothache so severe as to cause an intense neuralgic headache. The second superior right molar had a large cavity reaching almost to the pulp; it was excruciatingly sensitive to the touch; the application of the methyl produced a momentary degree of pain which was very intense, but in turn this was followed by complete local anæsthesia and an immediate disappearance of the headache. Sensation returned before the cavity was entirely prepared, and a second application was required to complete the operation. A temporary oxyphosphate filling was inserted, and there was no recurrence of pain.

April 19. Miss S. had cavities on the anterior approximate surface of the second right superior bicuspid and the posterior approximate surface of the first right superior bicuspid. They were acutely sensitive to the touch, but an application of the methyl produced complete local anæsthesia and a temporary stopping of

gutta-percha was inserted. On May 6th, after removing the stopping, the cavities were found to be so acutely sensitive that another application was made, the result being that gold fillings were inserted without the patient having any appreciable sensation of the operation.

April 22d. Miss F., of nervous temperament, had a cavity on the posterior approximate surface of the second inferior left molar; it was impossible to obtain direct access to the cavity with the nozzle of the spray apparatus, as then constructed, but an application was made as well as possible. It seemed only to increase the pain, and a second and third application produced no better result. The patient endured the pain, and had the cavity filled, but complained of intense suffering from the tooth during the following two nights, when the pain disappeared. On recent examination the pulp was found to respond perfectly to heat and cold.

April 26th. Mrs. F. had filled with copper amalgam on the day previous a cavity on the posterior approximate surface of the second superior left molar. The cavity was very deep, reaching under the gum, and though very sensitive no application was made on account of its inaccessibility. She had suffered all night with pain from the offending tooth, and there were present all the symptoms of incipient pulpitis. A tampon of cotton having been covered with glycerine and thoroughly saturated with chloride of methyl, was pressed firmly on the gum at a point where the apices of the buccal roots were supposed to be; immediate relief ensued. In about five minutes pain returned and again disappeared after another application. After longer intervals there was a recurrence of a lesser amount of pain, but after the fourth application the pain disappeared not to return.

April 27th. Miss S. had the first inferior right molar filled with copper amalgam six months previously. It was very painful at the time, and has always remained sensitive to cold and heat, which symptoms have increased in severity during the past week so markedly as to indicate approaching death of the pulp. After applying the rubber dam, the tooth was thoroughly saturated with the methyl spray, which produced immediate relief from all pain. With a recurrence of pain, four separate applications were made, after which the rubber dam was removed. The patient experienced

complete relief for about twenty minutes, when, according to her statement, the pain returned in a more intense form than had yet been experienced, and seemed proof against all counter-irritant treatment. An opening was then made through the filling into the pulp chamber, and the pulp removed.

The above detailed descriptions will give an idea of the average results obtained. Out of seventy-six cases, four alone were found to be proof against the action of the methyl, and two of these are believed to have been due to the inaccessibility of the cavities.

In conclusion, it is believed that, in the chloride of methyl, will be found a valuable addition to our therapeutic armamentarium. It appears to be the most reliable local anæsthetic yet introduced for preparing teeth for filling, though it is advised not to use it in a cavity near the pulp. It is wonderfully effective in affording immediate relief in all forms of neuralgia, and permanent cure in a majority of cases. Lastly, it has been found to be remarkably potent in the cure of incipient pulpitis, and though its application is always more or less painful, it seems to be generally preferred by patients to the pain from which they have been suffering.

